

# Parents' Intentions to Vaccinate Children Ages 12-17 for COVID-19: Demographic Factors, Geographic Patterns, and Reasons for Hesitancy

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## Key Points

- As COVID-19 vaccinations have become available for children ages 12-17, and clinical trials about vaccination for younger children are ongoing, understanding attitudes among parents and guardians<sup>1</sup> towards vaccinating children is an important question.
- Overall, parents and guardians had higher hesitancy rates about vaccinating themselves than did non-parents, and their hesitancy regarding vaccinating their children was even higher on average. About 26 percent of parents and guardians indicated they will “probably not,” “definitely not” or are “unsure” about vaccinating their children ages 12-17 for COVID-19, referred to as “hesitant.” This compares to 21 percent among those same adults towards their own vaccination plans and 10 percent among adults without children.
- Parents' intentions to vaccinate themselves for COVID-19 generally parallel their intentions to vaccinate children in their household for COVID-19, with similar patterns in terms of demographics.
- Vaccine hesitancy for children was highest among parents ages 25-39 (37 percent), among non-Hispanic Whites (32 percent), and non-Hispanic Other/Multiple race (37 percent), and those without a college education (29 percent).
- Vaccine hesitancy for children was lowest on the West Coast and in the Northeast, and highest in parts of the South, Midwest, and Mountain West.

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## Introduction

As of September 13, 2021, three vaccines to prevent infection with SARS-CoV-2, the virus that causes COVID-19, are available in the United States. The Pfizer vaccine was granted full approval for use in individuals over the age of 16 by the U.S. Food and Drug Administration

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<sup>1</sup> Our analysis uses new survey data from the Census that asks about parents' or guardians' intentions to vaccinate children in the household between the ages of 12 and 17; younger children are not currently assessed in the survey. We refer to these respondents as parents and guardians but in some cases, the adult being surveyed may not be the parent or guardian, and is responding to the question on their behalf.

(FDA) on August 23, 2021, and remains available under the May 10, 2021 emergency use authorization for individuals 12 through 15.<sup>2</sup> The other two vaccines, Moderna and Janssen's Johnson & Johnson, are authorized for use in individuals over the age of 18. Ongoing discussions suggest that a vaccine for children under the age of 12 may be available late in 2021.<sup>3,4</sup> With the return to in-person school for many children this fall and the potential upcoming authorization for a vaccine for children under age 12, it is important to understand the factors that impact adults' decision-making and perspectives about vaccinating children for COVID-19.

Childhood immunizations are established as effective interventions to reduce vaccine-preventable diseases and mortality. One study estimated that vaccinations prevented at least 103 million cases of infections such as measles, rubella, mumps and pertussis.<sup>5</sup> However, despite the benefits of vaccination, vaccination coverage in children and adolescents is not at optimal levels.<sup>6,7</sup> Hesitancy to vaccinate children has led to outbreaks of diseases that were once considered extremely rare in the United States.<sup>8</sup> For children and adolescents, parents or guardians are the proxy decision makers and, while some children are not able to be vaccinated for medical reasons or because vaccines are not readily available, the majority of decisions to forego vaccination in children are driven by the decision maker's vaccine hesitancy.<sup>9</sup> Studies have shown that the factors that influence the parent or guardian's decision to vaccinate their children involve vaccine- or disease-specific factors (e.g. perceived vaccine efficacy, perceived vaccine safety, perceived disease susceptibility), parent/guardian specific factors (race/ethnicity, education, income, knowledge about vaccines, past experiences, trust in government, beliefs that the risks outweigh the benefits, etc.) or other factors (patient-provider

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<sup>2</sup> US Food and Drug Administration. Comirnaty and Pfizer-BioNTech COVID-19 Vaccine. Available at <https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/comirnaty-and-pfizer-biontech-covid-19-vaccine>, last accessed September 8, 2021.

<sup>3</sup> Edwards, E. Covid Vaccines for kids under 12 expected midwinter, FDA official says. NBC News, July 15, 2021. Available at <https://www.nbcnews.com/health/health-news/vaccines-kids-under-age-12-expected-mid-winter-fda-official-n1274057>; last accessed September 8, 2021.

<sup>4</sup> Sullivan, P. Over 100 lawmakers ask FDA about timeline for vaccines for children. The Hill, August 17, 2021. Available at <https://thehill.com/policy/healthcare/568268-over-100-lawmakers-ask-fda-about-timeline-for-vaccines-for-children>; last accessed September 8, 2021.

<sup>5</sup> Anderson, E. (2014). Recommended Solutions to The Barriers to Immunization in Children and Adults. *Missouri Medicine*, 111(4): 344-348.

<sup>6</sup> Lindley, M., Orenstein, W., Shen, A., Rodewald, L., Birkhead, G. (2009). Assuring Vaccination of Children and Adolescents without Financial Barriers: Recommendations from the National Vaccine Advisory Committee (NVAC). Available at <https://wayback.archive-it.org/3919/20140403124817/http://www.hhs.gov/nvpo/nvac/nvacfwgreport.pdf>; last accessed September 8, 2021.

<sup>7</sup> National Vaccine Advisory Committee. (2019). 2020 National Vaccine Plan Development: Recommendations from the National Vaccine Advisory Committee. *Public Health Reports* 135(2): 181-188. doi:10.1177/0033354920904074

<sup>8</sup> Gardner, L., Dong E., Khan, K., Sarkar, S. (2020). Persistence of US measles risk due to vaccine hesitancy and outbreaks abroad. *The Lancet Infectious Diseases* 20(10), P114-115. doi:10.1016/S1473-3099(20)30522-3

<sup>9</sup> Damjanović, K., Graeber, J., Ilić, S., Lam, W. Y., Lep, Ž., Morales, S., Pulkkinen, T., & Vingerhoets, L. (2018). Parental Decision-Making on Childhood Vaccination. *Frontiers in psychology* 9, 735. doi:10.3389/fpsyg.2018.00735

relationship, school immunization requirements, collective values or social norms, policies, media).<sup>10,11,12,13</sup>

Although children are generally at lower risk of severe illness due to COVID-19, spread of the highly transmissible Delta variant has led to record levels of hospitalization in children.<sup>14,15</sup> Vaccinating children is a critical step in reducing spread of COVID-19 in the general population, as well as reducing school-based transmission. However, hesitancy to vaccinate eligible children against COVID-19 presents a considerable barrier to achieving this goal.

Addressing adults' concerns about vaccinating eligible children for COVID-19 requires communication approaches that are tailored to different groups in a way that will address their concerns. To support state and local communication and outreach efforts, this analysis explores parents' and guardians' intentions to vaccinate children ages 12-17 against COVID-19 in July and August 2021, including variation between geographic areas and sociodemographic groups.

## Methods and Data

### Data

ASPE examined sociodemographic factors and trends in vaccine hesitancy using survey data from the U.S. Census Bureau's Household Pulse Survey (HPS). In addition, ASPE developed estimates of hesitancy rates at the state and county level using the 2019 American Community Survey (ACS) 1-year Public Use Microdata Sample (PUMS).

The HPS is nationally representative and includes information on U.S residents' vaccination for COVID-19, intentions to receive the COVID-19 vaccine when available, intentions to vaccinate children ages 12-17, reasons for hesitancy to receive a vaccine or to vaccinate children as well as other sociodemographic and geographic (state, region and metropolitan statistical areas) information. The question about intention to vaccinate children 12-17 was first introduced in

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<sup>10</sup> Edwards, K., Hackell, J., The Committee on Infectious Diseases, The Committee on Practice and Ambulatory Medicine. (2016). Countering Vaccine Hesitancy. *Pediatrics* 138(3): e20162146. doi:10.1542/peds.2016-2146.

<sup>11</sup> Gowda, C., Dempsey A. (2013). The Rise (and Fall?) of Parental Vaccine Hesitancy. *Human Vaccines & Immunotherapeutics* 9(8): 1755-1762. doi:10.4161/hv.25085.

<sup>12</sup> Salmon DA, Moulton LH, Omer SB, deHart MP, Stokley S, Halsey NA. (2005). Factors Associated With Refusal of Childhood Vaccines Among Parents of School-aged Children: A Case-Control Study. *Arch Pediatr Adolesc Med* 159(5):470–476. doi:10.1001/archpedi.159.5.470.

<sup>13</sup> World Health Organization. Report of the SAGE Working Group on Vaccine Hesitancy, October 1, 2014. Available at [https://www.who.int/immunization/sage/meetings/2014/october/1\\_Report\\_WORKING\\_GROUP\\_vaccine\\_hesitancy\\_final.pdf](https://www.who.int/immunization/sage/meetings/2014/october/1_Report_WORKING_GROUP_vaccine_hesitancy_final.pdf); last accessed September 8, 2021.

<sup>14</sup> Centers for Disease Control and Prevention. COVID Data Tracker. Available at <https://covid.cdc.gov/covid-data-tracker/#new-hospital-admissions>; last accessed September 8, 2021.

<sup>15</sup> Siegel DA, Reses HE, Cool AJ, *et al.* (2021). Trends in COVID-19 Cases, Emergency Department Visits, and Hospital Admissions Among Children and Adolescents Aged 0–17 Years — United States, August 2020–August 2021. *MMWR Morb Mortal Wkly Rep* 70:1249–1254. doi:10.15585/mmwr.mm7036e1

the survey for the collection period July 21-August 2, 2021, and the HPS does not currently assess vaccine attitudes among parents of younger children. We utilized data from three HPS collection periods: July 21-August 2, 2021, August 4-16, 2021, and August 18-August 30, 2021. Each survey was sampled from approximately 1.04 million housing units, with an overall weighted response rate of about 6.0 percent and between 64,560 and 68,799 respondents.<sup>16</sup> The ACS is a nationally representative survey, and it provides key sociodemographic and geographic information, which we used to analyze vaccine hesitancy at the state and county levels. The 2019 ACS had a housing unit response rate of 86 percent (or 2,599,171 million respondents).<sup>17</sup>

## Defining Vaccine Hesitancy

We use the HPS survey question, *“Now that vaccines to prevent COVID-19 are available to most children between ages 12 and 17, will the parents or guardians of children ages 12-17 living in your household...”*, which provides the following options: 1) “definitely get the children a vaccine”; 2) “probably get the children a vaccine”; 3) “be unsure about getting the children a vaccine”; 4) “probably not get the children a vaccine”; 5) “definitely not get the children a vaccine.”<sup>18</sup> We use two definitions to capture the strength of hesitancy: We call the first “Hesitancy,” and it includes survey responses indicating that a parent or guardian was “unsure” or would “probably not” or “definitely not” get their children a COVID-19 vaccine. We refer to the second definition as “Strong Hesitancy,” and it includes only survey responses indicating that a parent or guardian would “definitely not” get their children a COVID-19 vaccine.

Our sample includes individuals who responded “yes”, “no” or “don’t know” to whether children ages 12-17 living in the household have received a COVID-19 vaccine.<sup>19</sup> We exclude respondents for whom there was no response. Those answering “yes” to having the children vaccinated are therefore treated as “not hesitant,” as are those who responded “definitely” or “probably” as to their intent to get a vaccine for children ages 12-17. For those who answered “no” or “don’t know” to whether a child in the household between the ages of 12 and 17 received the COVID-19 vaccine or who said they do not intend to get their child all required doses, the surveys also asks, *“Which of the following, if any, are reasons that the parents or guardians of children ages 12-17 living in your household [only probably will / probably won’t/definitely won’t/ are unsure about whether to] get a COVID-19 vaccine for the children?”*

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<sup>16</sup> U.S. Census Bureau. Source of the Data and Accuracy of the Estimates for the Household Pulse Survey-Phase 3.2. Available at [https://www2.census.gov/programs-surveys/demo/technical-documentation/hhp/Phase3-2\\_Source\\_and\\_Accuracy\\_Week%2036.pdf](https://www2.census.gov/programs-surveys/demo/technical-documentation/hhp/Phase3-2_Source_and_Accuracy_Week%2036.pdf), last accessed September 8, 2021.

<sup>17</sup> U.S. Census Bureau, American Community Survey Response Rates, <https://www.census.gov/acs/www/methodology/sample-size-and-data-quality/response-rates/>, last accessed May 25, 2021.

<sup>18</sup> Individuals who did not respond or answered “I do not know the plans for vaccination of the children aged 12-17 in my household” were excluded from the analysis.

<sup>19</sup> The question is “Have any of the children aged 12-17 years living in your household received at least one dose of a COVID-19 vaccine?” and the question is asked of parents or guardians indicating the presence of a child between the ages 12 and 17.

In addition to intent to vaccinate children ages 12-17, we also explore associated reasons provided by respondents.

Throughout this analysis we refer to “parents” to the pool of respondents with children ages 12-17, acknowledging that in some cases these respondents may not be the parent or guardian and is responding to the question on their behalf. We also refer to “non-parents” as those adults that responded there are no children under the age of 18 in the household.

## Predicting Parents’ Vaccine Hesitancy Rates

Our statistical analysis occurred in two steps. First, using the HPS, we used a logistic regression to analyze predictors of vaccine hesitancy for children in the household using the following sociodemographic and geographic information: age, gender, race/ethnicity, education, marital status, health insurance status, household income, state of residence, and interaction terms between race/ethnicity and having a college degree among the sample of respondents who indicated there were children between the ages 12 and 17 in the household. We note that due to sample size, this model was estimated by pooling results from all three surveys available at the time of analysis.<sup>20</sup>

Second, we applied the regression coefficients from the HPS analysis to the data from the ACS to predict vaccine hesitancy for children in the household for each ACS respondent ages 18 and older and where the presence of any child under the age of 18 was reported.<sup>21</sup> We then averaged the predicted values by the appropriate unit of geography, using the ACS survey weights, to develop area-specific estimates of hesitancy rates. For further details on the methodology see Appendix 1.

## Results

### Parents’ hesitancy to vaccinate themselves or children aged 12-17 in household

Across the three waves of the HPS administered between July 21 and August 30, 2021, 10 percent of adults without children indicated hesitancy to vaccinate themselves against COVID-19 (Table 1). Among parents and guardians with children ages 12-17 in the household, hesitancy tended to be higher, with approximately 21 percent indicating hesitancy to vaccinate

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<sup>20</sup> Overall estimates of hesitancy to vaccinate children ages 12-17 were relatively steady during this time; therefore, we consider the pooled data to provide more robust insights into differences between demographic groups and geographic areas.

<sup>21</sup> The ACS does not provide demographic breakdowns specific to households with children between the ages of 12-17, as was surveyed in the HPS. As a result, we use ACS demographic estimates for households with any children under the age of 18.

themselves against COVID-19. These same adults were asked about their plans to vaccinate their children ages 12-17: 26 percent indicated hesitancy.

**Error! Reference source not found.** also summarizes demographic characteristics associated with hesitancy in non-parents, and in parents/guardians for themselves or for children. Hesitancy to vaccinate themselves or children in the household was similar between male and female respondents. However, there was variation in hesitancy rates when examining by age groups, race/ethnicity and college completion. Among the five race/ethnicity categories, hesitancy was lowest among Asian (non-Hispanic) respondents and highest among White or Other/Multiple (non-Hispanic) respondents. Generally, hesitancy rates were higher among those without a college degree.

Table 1. Adults' Hesitancy to Vaccinate Themselves and Children by Select Demographic Characteristics <sup>22</sup>			
Demographic Characteristic	Non-Parents' Hesitancy to Vaccinate Themselves	Parents' Hesitancy to Vaccinate Themselves	Parents' Hesitancy to Vaccinate Children Ages 12-17
<b>Overall</b>	10%	21%	26%
Male	11%	21%	25%
Female	9%	21%	28%
Age: 18-24	17%	22%	24%
Age: 25-39	13%	32%	37%
Age: 40-54	15%	17%	24%
Age: 55-64	9%	12%	21%
Age: 65+	5%	15%	24%
White (non-Hispanic)	11%	24%	32%
Black (non-Hispanic)	11%	21%	26%
Asian (non-Hispanic)	2%	2%	7%
Other/Multiple Race	15%	27%	37%
Hispanic	10%	16%	19%
No College Degree	13%	24%	29%
College Degree or Higher	5%	11%	19%
Non-College White (non-Hispanic)	14%	30%	37%

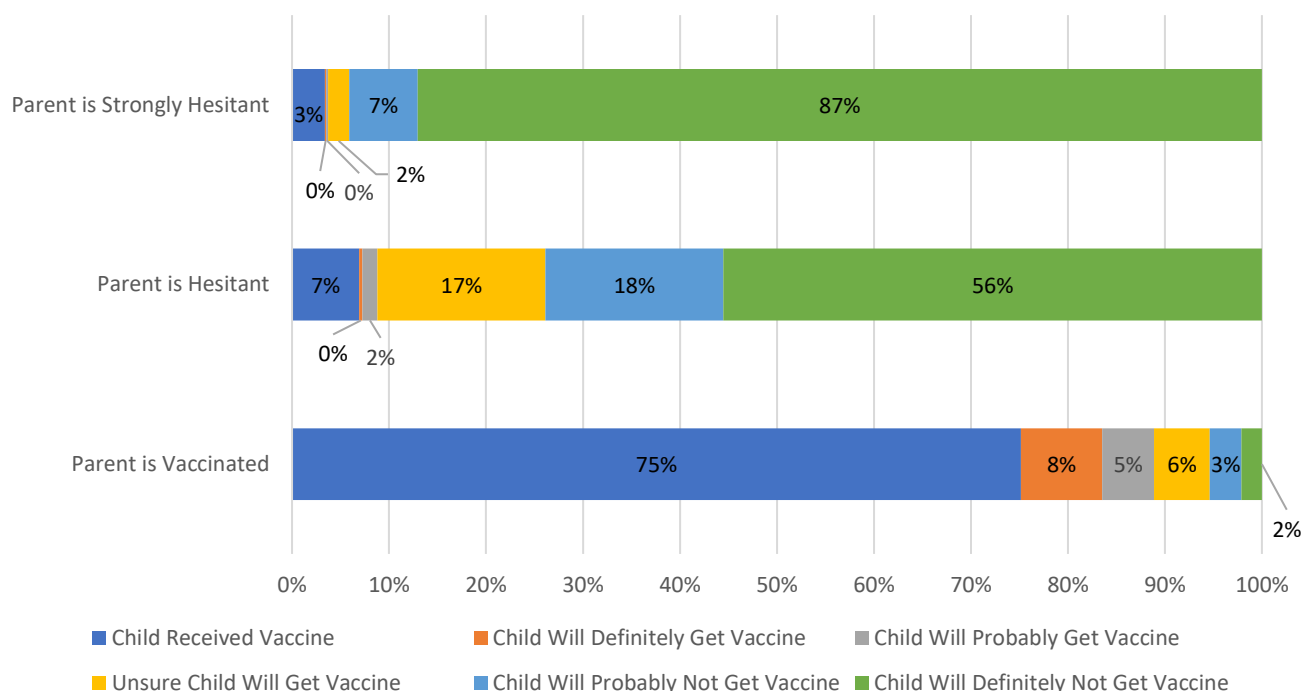
<sup>22</sup> Non-parents are those without children under the age of 18 in the household. "Parents" refers to the pool of respondents with children ages 12-17 in their household. The survey asks about parents' or guardians' intentions to vaccinate children in the household between the ages of 12 and 17. We refer to these respondents as parents and guardians but in some cases, the adult being surveyed may not be the parent or guardian, and is responding to the question on their behalf.

College White (non-Hispanic)	5%	12%	20%
Non-College Black (non-Hispanic)	13%	24%	28%
College Black (non-Hispanic)	6%	10%	18%
College Non-College Asian (non-Hispanic)	3%	3%	9%
College Asian (non-Hispanic)	1%	2%	5%
Non-College Other/Multiple Race (non-Hispanic)	18%	29%	40%
College Other/Multiple Race (non-Hispanic)	9%	21%	27%
Non-College Hispanic	11%	16%	19%
College Hispanic	6%	16%	23%

*Note: Hesitancy is defined to include those who responded, “will definitely not” or “definitely not” or “unsure” about giving a COVID-19 vaccine to children ages 12-17, or to vaccinate themselves. Sample excludes respondents with missing values or those responding, “I do not know the plans to vaccinate children in the household”. Parents refers to the group of adults who responded to the survey question regarding the intentions of the parents or guardians to vaccinate children ages 12-17. Source: ASPE analysis of the Household Pulse Survey, pooling results from the July 21-August 2, 2021, August 4-August 16, 2021, and August 18-August 30, 2021 surveys.*

Although overall rates of hesitancy were higher for vaccinating children ages 12-17, parents’ intentions to vaccinate their children tended to parallel their intentions to get vaccinated themselves. **Error! Reference source not found.** presents parents’ intentions to get a COVID-19 vaccine for themselves and how that relates to their intentions to vaccinate children 12-17 living in their household. Among parents who have been vaccinated, 75 percent also stated that children in their household have been vaccinated. Among strongly hesitant parents, 87 percent stated that they would definitely not vaccinate children in their household.

**Figure 1. Parents' Intentions to Vaccinate Themselves vs. Children Living in the Household**



*Note: Hesitancy is defined as those who responded, “probably not” or “definitely not” or “unsure” to get a COVID-19 vaccine for themselves or to give a COVID-19 vaccine to children ages 12-17 present in the household. Parents refers to the group of adults who responded to the survey question regarding the intentions of the parents or guardians to vaccinate children ages 12-17. Values represent the percent of adults indicating a particular response for themselves who also gave a particular response for children in their household.*

*Source: ASPE analysis of Household Pulse Survey, pooling results from the July 21-August 2, 2021, August 4-August 16, 2021, and August 18-August 30, 2021 surveys.*

## Demographic Predictors of Parents' Hesitancy to Vaccinate Children Ages 12-17

A logistic regression model was used to predict parents' hesitancy to vaccinate children in their household by certain demographic characteristics. **Error! Reference source not found.** shows the odds ratios from this model. The results indicate that several factors were significantly associated with higher odds of being hesitant to vaccinate children in the household: younger age (25-39), being uninsured, and having Medicaid. Hispanic respondents with college degrees were more likely to be hesitant than White respondents with college degrees. However, respondents with a college degree, as well as Black, Asian, and Hispanic respondents were less likely to be hesitant to vaccinate children in the household. Similar results were observed for the model predicting strong hesitancy.



**Table 2. Odds Ratios: Factors Associated with Parents' Hesitancy to Vaccinate Children Ages 12-17**

Demographic Characteristic <sup>23</sup>		Hesitant	Strongly Hesitant
<b>Age</b>	18-24	Ref.	Ref.
	25-39	2.01***	2.19***
	40-54	1.17	1.22
	55-64	0.90	0.80
	65+	1.13	1.33
<b>Gender</b>	Male	0.95	1.16
	Female	Ref.	Ref.
<b>Race/Ethnicity</b>	White (non-Hispanic)	Ref.	Ref.
	Black (non-Hispanic)	0.52***	0.46***
	Hispanic	0.38***	0.33***
	Asian (non-Hispanic)	0.22***	0.12***
	Other/Multiple race	1.09	0.94
<b>College * Race/Ethnicity</b>	White (non-Hispanic)	Ref.	Ref.
	Black (non-Hispanic)	1.31	0.90
	Hispanic	2.83***	4.50***
	Asian (non-Hispanic)	1.12	0.82
	Other/Multiple Race (non-Hispanic)	1.26	2.53**
<b>Education</b>	Less than high school	Ref.	Ref.
	High school	1.28	1.07
	Some college	0.99	0.78
	College or higher	0.58***	0.44***
<b>Marital status</b>	Married	Ref.	Ref.
	Widowed	1.08	1.11
	Divorced/Separated	0.91	0.94
	Never Married	0.99	0.96
	Missing	0.85	1.65
<b>Health Insurance</b>	Private Health Insurance	Ref.	Ref.
	Medicare	0.85	0.61
	Medicaid	1.50***	1.40*
	Other Health Insurance	1.17	1.12

<sup>23</sup> These demographic characteristics describe the respondent, who in some cases may not be the parent or guardian of the child but is responding on their behalf.

**Table 2. Odds Ratios: Factors Associated with Parents' Hesitancy to Vaccinate Children Ages 12-17**

Demographic Characteristic <sup>23</sup>		Hesitant	Strongly Hesitant
	Uninsured	1.43**	1.55**
	Missing Health Insurance	1.25*	1.12
<b>Income</b>	Less than \$25,000	Ref.	Ref.
	\$25,000-\$35,000	1.25	0.85
	\$35,000-\$50,000	0.88	0.91
	\$50,000-\$75,000	0.81	0.88
	\$75,000-\$100,000	0.89	0.99
	\$100,000-\$150,000	0.76	0.79
	\$150,000-\$200,000	0.85	1.01
	More than \$200,000	0.66**	0.89
	Did not report	0.93	1.15
<b>Constant</b>		0.92	0.21***

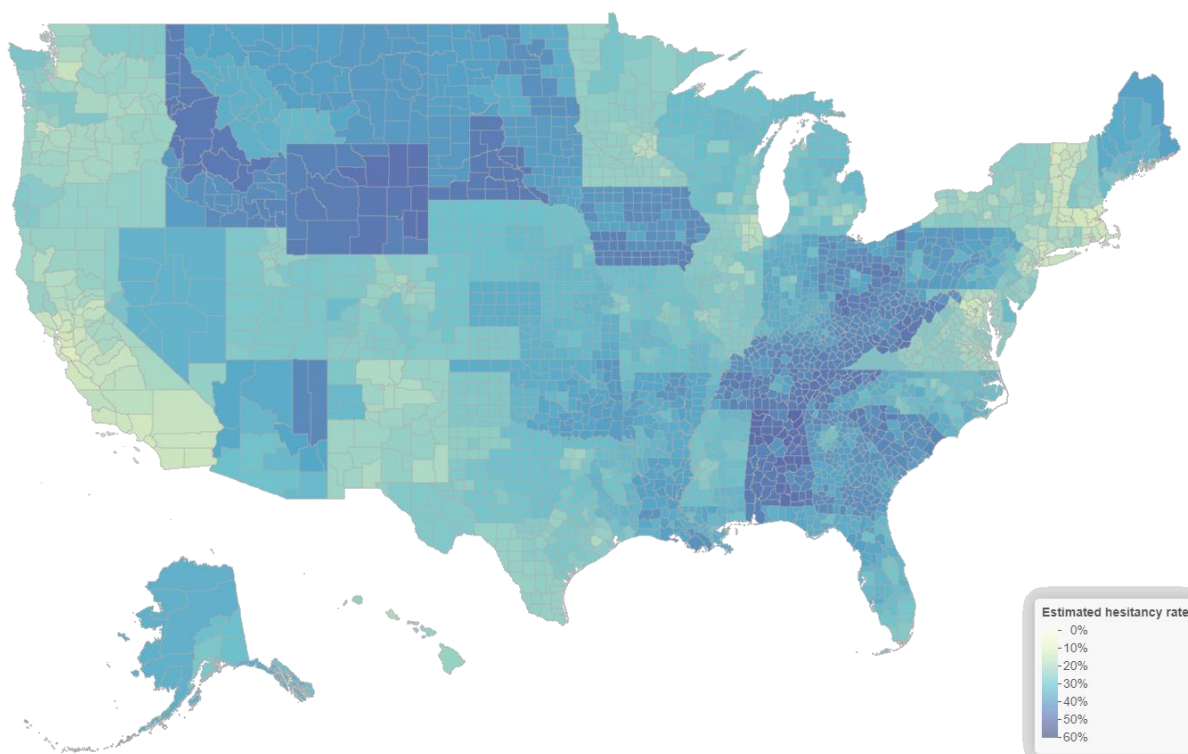
*Note: Hesitant is defined to include those who responded, “will definitely not” or “definitely not” or “unsure” about giving a COVID-19 vaccine to children ages 12-17. Strongly Hesitant is defined to include those who responded, “will definitely not” get a COVID-19 vaccine for children ages 12-17. Parents refers to the group of adults who responded to the survey question regarding the intentions of the parents or guardians to vaccinate children ages 12-17. \*\*\* p-value < 0.001; \*\* p-value < 0.01; \* p-value < 0.05.*

*Source: ASPE analysis of the Household Pulse Survey, pooling results from the July 21-August 2, 2021, August 4-August 16, 2021, and August 18-August 30, 2021 surveys.*

## Geographic Patterns of Parents' Hesitancy to Vaccinate Children

**Error! Reference source not found.**Figure presents predicted hesitancy rates, as estimated by our model, at the county level. Our model predicts significant geographic variation in hesitancy to vaccinate children, ranging from 10 percent to 51 percent. Vaccine hesitancy rates were the lowest on the West Coast and in the Northeast, and higher in certain states in the South, Midwest, and the Mountain West.

**Figure 2. Estimated Hesitancy to Vaccinate Children Aged 12-17, by County**



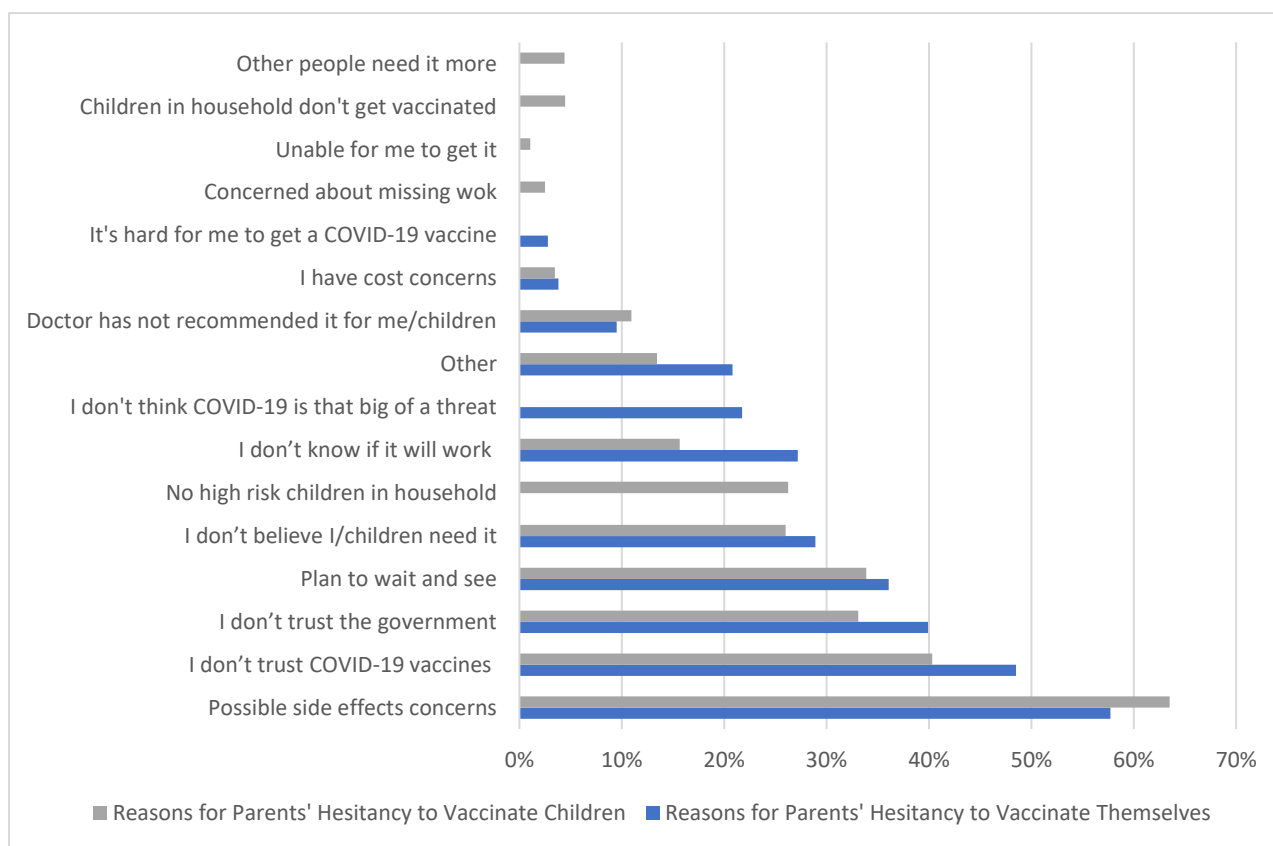
*Note: Hesitancy is defined as those who responded, “probably not” or “definitely not” or “unsure” to get a COVID-19 vaccine for children ages 12-17 present in the household.*

*Source: ASPE analysis of Household Pulse Survey, pooling results from the July 21-August 2, 2021, August 4-August 16, 2021, and August 18-August 30, 2021 surveys.*

## Reasons for Vaccine Hesitancy

Figure 2 shows the reasons for parents’ hesitancy to vaccinate themselves and children ages 12-17 for a COVID-19 vaccine. About 58 percent and 64 percent cited vaccine safety concerns for themselves and their children, respectively; 40 percent cited lack of trust in COVID-19 vaccines as a reason not to vaccinate children. Over 30 percent of respondents selected the reasons “I plan to wait and see if it is safe” or “I don’t trust the government” as reasons not to vaccinate themselves or children. About 25 percent of respondents said they didn’t believe they or their children need it or that there were no high-risk children in the household. Overall, respondents gave similar reasons not to vaccinate for both themselves and their children.

**Figure 2. Reasons for Parents' Hesitancy to Vaccinate Themselves and Children for COVID-19**



*Note: Respondents may select multiple reasons for hesitancy. Parents refers to the group of adults who responded to the survey question regarding the intentions of the parents or guardians to vaccinate children ages 12-17. The following reasons were only asked of parents regarding hesitancy to vaccinate children: "other people need it more", "children in household don't get vaccinated", "unable for me to get it", "concerned about missing work", and "no high risk children in household". The following reasons were only asked of parents regarding hesitancy to vaccinate themselves: "it's hard for me to get a COVID-19 vaccine", and "I don't think COVID-19 is that big of a threat".*

*Source: ASPE analysis of Household Pulse Survey, pooling results from the July 21-August 2, 2021, August 4-August 16, 2021, and August 18-August 30, 2021 surveys.*

In **Error! Reference source not found.**-Figure S-3 we present parents' reasons for hesitancy by select demographic characteristics. Among those who said they will "probably not" or "definitely not," or were "unsure" about getting a COVID-19 vaccine for children ages 12-17, those in the 18-24 age group were more likely to say they do not believe the children need a COVID-19 vaccine (30 percent) followed by those 65 and older (27 percent). Hispanic respondents were more likely (65 percent) than other groups (32 percent to 36 percent) to say that they "plan to wait and see" before getting the COVID-19 vaccine to children ages 12-17. Respondents with higher levels of education were more likely to say they were concerned about possible side effects (68 percent for college graduates vs. 52 percent for those without a high school diploma).

## Discussion

Many Americans who are parents or guardians of children ages 12-17 are hesitant to vaccinate their children. Our analysis shows that almost a quarter of adults with children in their household between the ages of 12-17 are hesitant to get the children vaccinated, and adults' intentions to vaccinate children generally parallel intentions to vaccinate themselves – although hesitancy tends to be even higher with respect to vaccinating children. These results align with those that have been reported by others. For instance, in four Kaiser Family Foundation (KFF) surveys administered between April and July 2021, between 20 and 25 percent of parents of children between ages 12 and 17 reported that they would “definitely not” get their child a COVID-19 vaccine as soon as it is available.<sup>24</sup> This survey also observed that parental hesitancy was correlated with hesitancy to vaccinate children: among vaccinated adults in July 2021, 60 percent had vaccinated their children ages 12-17, while only 4 percent of unvaccinated adults had done so. Another survey, conducted in February and March 2021, found that parents' vaccination status or intention to be vaccinated was the most important factor in predicting the parents' intention to vaccinate their children.<sup>25</sup>

Further, our analysis shows that differences in intent to vaccinate children ages 12-17 for COVID-19 vary by racial and ethnic groups, ages, education, socioeconomic status and geographic areas. Other studies have found similar differences in hesitancy to vaccinate children between demographic groups. For example, as of July 2021, KFF found that 24 percent of Whites, 19 percent of Blacks and 12 percent of Hispanics indicated that they will definitely not vaccinate their children between the ages of 12 and 17.<sup>26</sup> Differences in hesitancy to vaccinate children have also been observed by socioeconomic status and education.<sup>27,28</sup>

We also explored the reasons for hesitancy and found that the top cited reasons are concerns about vaccine safety and trust in government or vaccines, followed by plans to wait and see. Other studies have found similar results and highlight the complexity of the issue. Among parents of children ages 12 to 17, the KFF found that 23 percent have indicated that they plan

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<sup>24</sup> Hamel, L., Lopes, L., Kearney, A., Kirzinger, A., Sparks, G., et al. KFF COVID-19 Vaccine Monitor: Parents and the Pandemic, August 11, 2021. Available at <https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-parents-and-the-pandemic/>; last accessed September 8, 2021.

<sup>25</sup> Szilagyi, P., Shah, M., Delgado, J., Thomas, K., Vizueta, N., Cui, Y., Vangala, S., Shetgiri, R., Kapteyn, A. (2021). Parents' intentions and perceptions about COVID-19 vaccination for their children: Results from a national survey. *Pediatrics* 148(3). doi:10.1542/peds.2021-052335

<sup>26</sup> Hamel, L., Lopes, L., Kearney, A., Kirzinger, A., Sparks, G., et al. KFF COVID-19 Vaccine Monitor: Parents and the Pandemic, August 11, 2021. Available at <https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-parents-and-the-pandemic/>; last accessed September 8, 2021.

<sup>27</sup> Szilagyi, P., Shah, M., Delgado, J., Thomas, K., Vizueta, N., Cui, Y., Vangala, S., Shetgiri, R., Kapteyn, A. (2021). Parents' intentions and perceptions about COVID-19 vaccination for their children: Results from a national survey. *Pediatrics* 148(3). doi:10.1542/peds.2021-052335

<sup>28</sup> Simonson, M., Chwe, H., Lazer, D., et al. COVID19 Consortium Report 49: Parents, May 2021. Available at <https://osf.io/staci/>; last accessed September 8, 2021.

to wait and see before their child gets vaccinated for COVID-19.<sup>29</sup> Another study reported that parents expressed concern about the vaccine's impact on puberty (51%), possible long-term health effects (51%), and many also expressed nervousness about making a wrong decision for their kids (48%) or that it might impact future fertility (45%).<sup>30</sup> In another study, parents have expressed beliefs that the risk of adverse events associated with the vaccine is greater than the risk of severe illness from COVID-19. These concerns parallel many of the concerns that parents have regarding routine childhood immunizations of pre-existing vaccines and suggest that existing strategies used to combat vaccine hesitancy in routine immunizations could be applied to discussions about COVID-19 vaccine confidence in children.<sup>31</sup> Strategies to address parental hesitancy for child vaccinations against COVID-19 should take into account known factors affecting decision making and be tailored to address the specific concerns that many parents have about COVID-19 vaccines, as demonstrated in studies, as well as the individual parent's concern.

## Limitations

This analysis does not attempt to include all potential variables that may impact hesitancy to vaccine children, and hesitancy is not the sole determinant of a vaccination strategy. In other reports, we have examined access to vaccinations and administration rates across states.<sup>32,33</sup> Thus, our estimates should be used with caution when attempting to generalize beyond the factors examined herein. In addition, our estimates should be used in conjunction with other relevant information. Local contextual information, including trends and data related to vaccine access, community morbidity and mortality, social vulnerability, and vaccine administration can provide additional insights and applicability.

Our estimates use individual level responses intended to capture sentiment within different geographic levels in the U.S. at the time of the survey; careful consideration is advised when

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<sup>29</sup> Hamel, L., Lopes, L., Kearney, A., Kirzinger, A., Sparks, G., et al. KFF COVID-19 Vaccine Monitor: Parents and the Pandemic, August 11, 2021. Available at <https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-parents-and-the-pandemic/>; last accessed September 8, 2021.

<sup>30</sup> SYKES. Survey Report: Parents' Perceptions of COVID-19 Vaccines for Kids. Available at <https://www.sykes.com/resources/reports/parents-perceptions-of-covid-19-vaccines-for-kids/>; last accessed September 8, 2021.

<sup>31</sup> Gonzales, A.B., Lee, E.C., Grigorescu, V., Smith, S.R., De Lew, N., and Sommers, B.D. Overview of Barriers and Facilitators in COVID-19 Vaccine Outreach (Research Report No. HP-2021-19). Office of the Assistant Secretary for Planning and Evaluation, U. S. Department of Health and Human Services. September 2021. Available at <https://aspe.hhs.gov/reports/covid-19-vaccine-outreach>; last accessed September 14, 2021.

<sup>32</sup> Kolbe, A. Factors influencing variation between states in efficiency of COVID-19 vaccine administration. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. April 2021. Available at <https://aspe.hhs.gov/pdf-report/covid-19-vaccine-administration>; last accessed May 25, 2021.

<sup>33</sup> Kolbe, A. Disparities in COVID-19 Vaccination Rates across Racial and Ethnic Minority Groups in the United States. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. April 2021. Available at <https://aspe.hhs.gov/pdf-report/covid-19-vaccination-disparities>; last accessed May 25, 2021.

examining questions outside of the time period or geographic level assessed in this analysis. Our estimates at the county level are subject to greater sampling error and uncertainty due to predictive modeling than those at the state level, and therefore are less precise; accordingly, they should be used with caution for purposes that require precise estimates. Due to nonresponse bias, the HPS may not be fully representative of all U.S. adults and survey-based estimates for vaccination rates may not match data from other sources. A full discussion of limitations associated with the HPS can be found in the survey's technical documentation.<sup>34</sup> Finally, our estimates from the HPS are drawn from adult respondents who indicated the presence of a child aged 12-17 for which a vaccine is available, but the sample in the ACS includes adults where the presence of any child. The estimate may differ if the population of adults with any child under the age of 17 is different than those with children ages 12-17.

## Conclusions

Overcoming vaccine hesitancy is essential to slowing transmission of SARS-CoV-2. Our analysis shows hesitancy around COVID-19 vaccines is a significant challenge for public health but also a complex and multi-faceted issue. It also shows that there are parallels between adult hesitancy to vaccinate themselves and to vaccinate their children, but overall rates of hesitancy are higher among parents than non-parents, and higher among parents with respect to their children than to themselves. Continued monitoring of vaccine hesitancy over time is critical for policy decision makers to adjust the communication strategies, including the methods, language, and messengers, to improve confidence in COVID-19 vaccines.

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<sup>34</sup> U.S. Census Bureau. Household Pulse Survey Technical Documentation. Available at <https://www.census.gov/programs-surveys/household-pulse-survey/technical-documentation.html>; last accessed May 20, 2021.



## Appendix 1: Methodology

We use the U.S. Census Bureau's Household Pulse Survey (HPS) and the 2019 American Community Survey (ACS). The HPS is designed to capture household experiences during the coronavirus pandemic.<sup>4</sup> We use three waves of the HPS Phase 3.2 public use files beginning in July 21-August 2, 2021 through August 18-August 30, 2021. The collection period of July 21-August 2, 2021 was the first wave in which the survey instrument asked about an individual's intention to get a COVID-19 vaccine for children ages 12-17 living in the household.<sup>35</sup> HPS also includes other sociodemographic information such as gender, age, household income, race/ethnicity, educational level, insurance coverage and location of residence (state, region, and metropolitan and micropolitan statistical areas). In phase 3.2 of the HPS, the survey also asks about the presence of children living in the household by the following age categories: under 5, 5-11, 12-17.

The ACS is a household survey that captures social, housing and economic information. Like the HPS, the ACS also includes information on gender, age, educational attainment, household income, race/ethnicity, and insurance coverage. The ACS also captures information about the presence of (own or unrelated) children in the household for the following age categories: under 5 and 5-17. In addition to state and region information, the ACS provides smaller geographic areas such as public use microdata areas (PUMAs).<sup>36</sup> To create county-level estimates, we used a PUMA-to-county crosswalk from the Missouri Census Data Center. PUMAs spanning multiple counties had their estimates apportioned across those counties based on overall 2010 Census populations. We use the appropriate survey weights to produce summary statistics and to estimate the regression model.

We use a binary logistic regression model characterized by equation (1) to obtain hesitancy estimates using all three surveys:

$$(1) \text{ logit}(H_{i,k}=1 | X,Z)=\alpha+\beta X+ s.$$

In equation (1),  $H_i$  is equal to one if respondent  $i$  in wave  $k$  indicated that they would "definitely not" or "probably not", or "unsure" about get the COVID-19 vaccine for children ages 12-17 living in the household and zero if the response is "definitely", "probably", and "yes".  $X$  is a set of sociodemographic characteristics for respondent  $i$  in wave  $k$ : age (18-24, 25-39 40-54, 55-64, 65+), gender, race/ethnicity (Hispanic, non-Hispanic White, non-Hispanic Black, non-Hispanic Asian, and Other/Multiple Race), education (less than high school, high school, some college, college or higher), marital status (married, widowed, divorced or separated, never married, missing), health insurance status (employer-sponsored, nongroup private, Medicare, Medicaid, military, Veterans Affairs, Indian Health Services, Other, uninsured, missing), and household income. To examine whether college education has varying impacts on individual's intention to vaccinate, the model considers the interaction between race/ethnicity and college attainment. The model also includes state indicators,  $s$ , to capture time-invariant state-specific attitudes or patterns.

We estimated equation (1) using combined data for three different waves of the HPS (in sample) data by state and then use the estimated coefficients for the pooled data to predict hesitancy rates in the 2019

<sup>35</sup> Specifically, the question is "Now that vaccines to prevent COVID-19 are available to most children between ages 12 and 17, will the parents or guardians of children ages 12-17 living in your household...?"

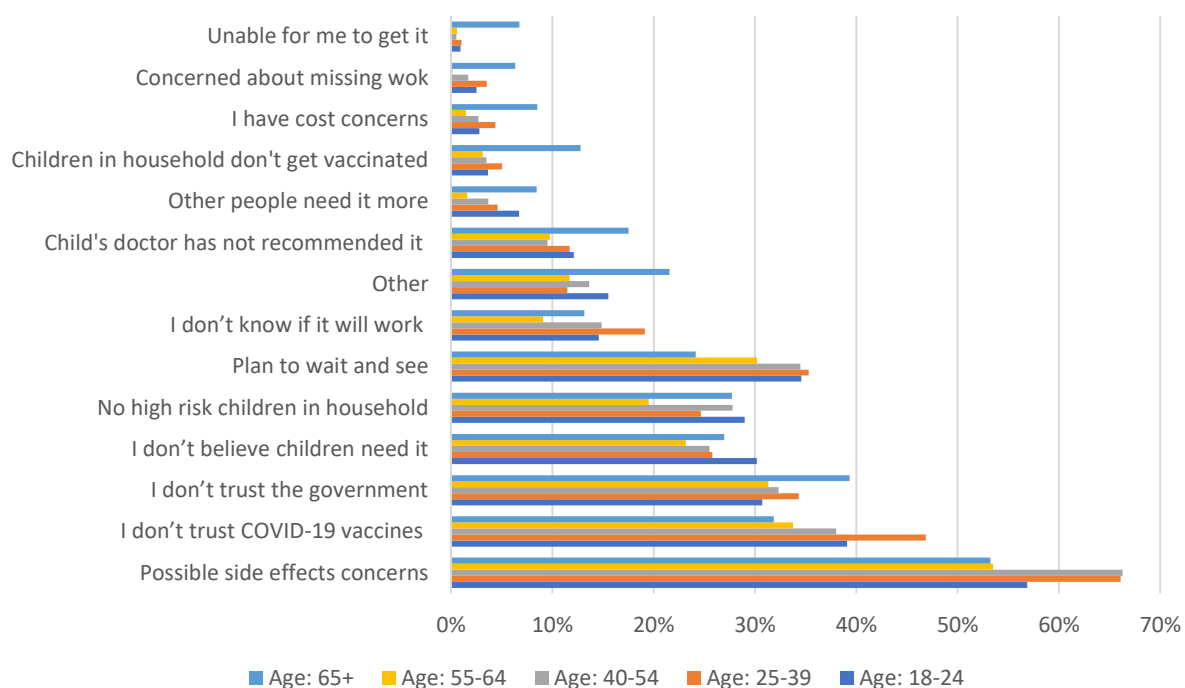
<sup>36</sup> PUMAs represent the most granular level of geography available in the ACS public use file. PUMAs are defined as areas that contain no fewer than 100,000 people.



ACS (out of sample) by counties. Finally, because the sample of respondents in the HPS for which adults' intentions to vaccinate children ages 12-17 included adults where the presence of a child was reported, our ACS sample includes those where the presence of any child was reported.

## Appendix 2. Supplementary Analysis

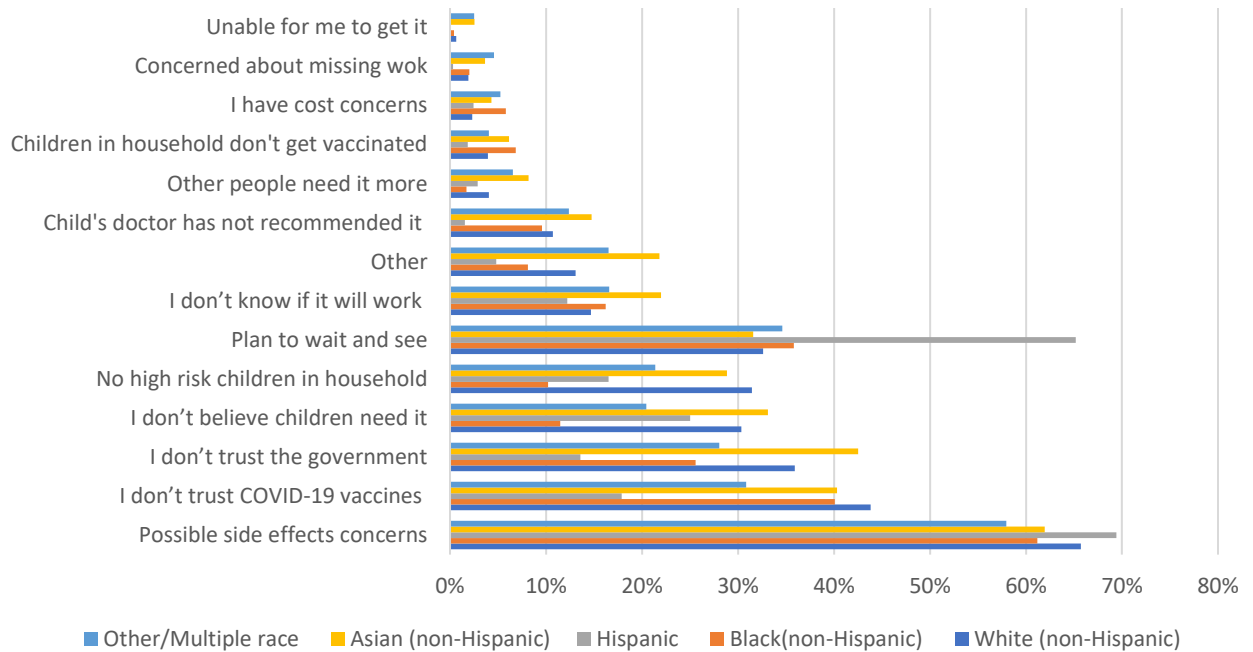
**Figure S-1. Parents' Reasons for Hesitancy to Vaccinate Children by Age**



*Note: Respondents may select multiple reasons for hesitancy. Hesitancy is defined as those who responded, "probably not" or "definitely not" or "unsure" about getting a COVID-19 vaccine for children 12-17. Parents refers to the group of adults who responded to the survey question regarding the intentions of the parents or guardians to vaccinate children ages 12-17. These demographic characteristics describe the respondent, who in some cases may not be the parent or guardian of the child but is responding on their behalf.*

*Source: ASPE analysis of Household Pulse Survey, pooling results from the July 21-August 2, 2021, August 4-August 16, 2021, and August 18-August 30, 2021 surveys.*

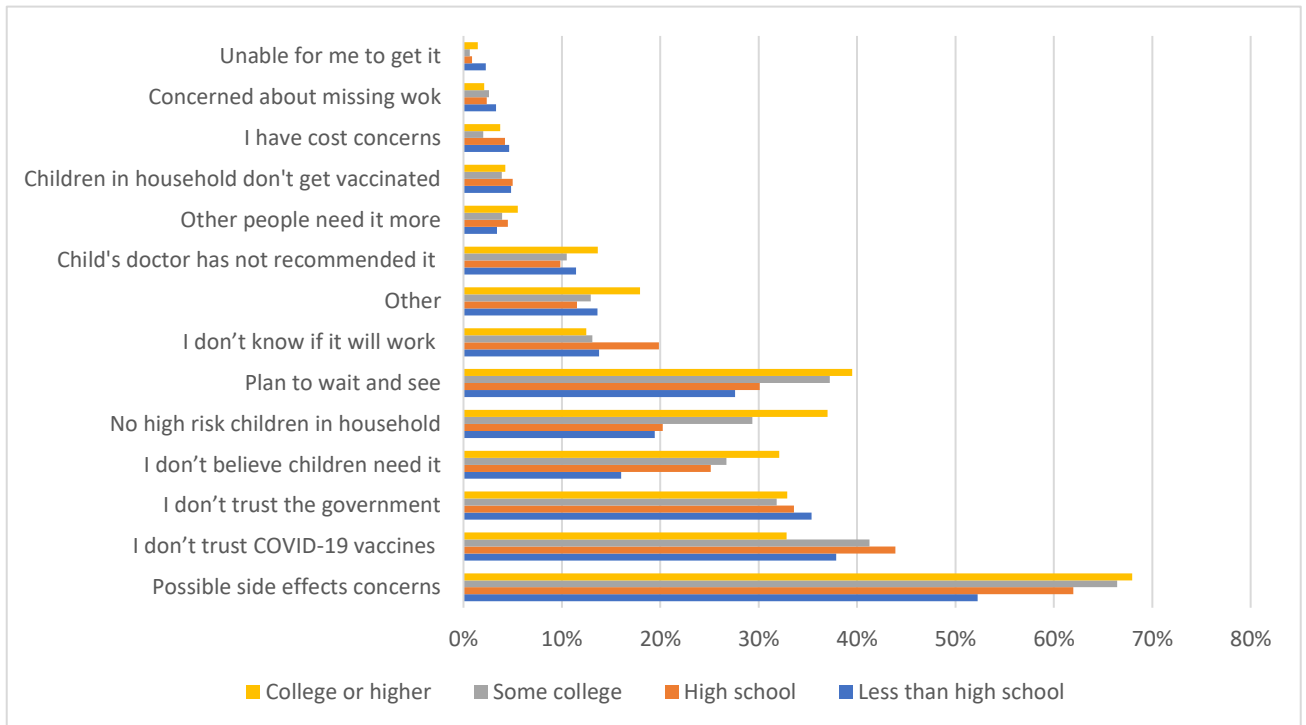
**Figure S-2. Parents' Reasons for Hesitancy to Vaccinate Children by Race/Ethnicity**



*Note: Respondents may select multiple reasons for hesitancy. Hesitancy is defined as those who responded, “probably not” or “definitely not” or “unsure” about getting a COVID-19 vaccine for children 12-17. Parents refers to the group of adults who responded to the survey question regarding the intentions of the parents or guardians to vaccinate children ages 12-17. These demographic characteristics describe the respondent, who in some cases may not be the parent or guardian of the child but is responding on their behalf.*

*Source: ASPE analysis of Household Pulse Survey, pooling results from the July 21-August 2, 2021, August 4-August 16, 2021, and August 18-August 30, 2021 surveys.*

**Figure S-3. Parents' Reasons for Hesitancy to Vaccinate by Education**



*Note: Respondents may select multiple reasons for hesitancy. Hesitancy is defined as those who responded, “probably not” or “definitely not” or “unsure” about getting a COVID-19 vaccine for children 12-17. Parents refers to the group of adults who responded to the survey question regarding the intentions of the parents or guardians to vaccinate children ages 12-17. These demographic characteristics describe the respondent, who in some cases may not be the parent or guardian of the child but is responding on their behalf.*

*Source: ASPE analysis of Household Pulse Survey, pooling results from the July 21-August 2, 2021, August 4-August 16, 2021, and August 18-August 30, 2021 surveys.*

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